Environmental Management Systems and Asset Management

Tools to Reduce Cost, Manage Risk, and Improve Performance

"The U.S. EPA Office of Wastewater Management has and will continue to support the use of EMS and AM as proven risk management tools. In working with a number of utility practitioners, we also plan to highlight the importance of integrating these approaches. This natural evolution will help utilities ensure that their operations and infrastructure are sustainable in the future."

- Jim Horne, U.S. EPA Office of Wastewater Management

"Integrating your EMS and asset management plans will allow you to maximize the benefits of both management systems."

- Andy Kricun, CCMUA, New Jersey

"We were able to develop 80% of our asset management system by using our EMS Processes."
- Rick Bickerstaff Charleston Water, South Carolina

While providing safe and efficient services to their communities, wastewater utilities in the United States face funding shortages, an aging workforce, new environmental regulations, security concerns and infrastructure nearing the end of its useful life.

To address these complex pressures, many utilities have turned to **Asset Management** (AM) and **Environmental Management Systems** (EMS) as proven risk management approaches. An AM facilitates prioritization of assets and infrastructure risks, while an EMS provides a process and framework for prioritizing environmental risks, including risks from aging or improperly managed infrastructure. Each approach establishes processes and procedures, based on a continuous improvement process of plan-do-check-act, to minimize risks through operational controls, short- and long-term planning and performance metrics. EMS and AM plans should not be seen as competing approaches. They are entirely complimentary and, when used together, can provide utilities with a powerful and proven approach for helping to ensure long-term sustainability.

EMS and AM Benefits Realized by Wastewater Utilities

- Lowering your operations and maintenance costs (25% in Camden Cnty, NJ);
- Reducing sanitary sewer overflows (85% in Kent Cnty, DE);
- Increasing your preventive/corrective maintenance ratio (over 70% in Charleston, SC); or
- Decreasing the number of violations for discharge limitations (by 10% in South Carolina);
- Achieving cost savings by greater use of renewable energy ($200-300k in Kent Cnty, DE).

Wastewater utilities from across the nation have utilized these tools individually with outstanding results; however, a number of leading utilities have increasingly broadened their approaches and accomplishments by integrating their systems for increased return on investment.

Benefits of Integrating EMS and AM from Wastewater Utilities

- Implementing an EMS will ensure that your asset management and other goals are pursued, and met, through a systematic framework that requires continual evaluation and improvement;
- Implementing an asset management system will give you abundant opportunities to make positive improvements and meet the goals of your EMS;
- Enhanced operational consistency and reliability;
- Reduced employee stress and confusion associated with multiple, disconnected initiatives;
- Continual improvement in strategically prioritized and targeted areas;
- Coordinated resources (human and financial) and streamlined communications; and,
- Informed, strategic business decisions that are environmentally sound and assure sufficient resources for the future needs of communities.

What's inside this pamphlet?
If you already have an EMS or asset management program, or are developing one, there are a number of points where your asset management and EMS activities can be integrated. In the following pages, you'll find more information about EMS and AM, as well as an examination of logical connection points. Included throughout will be quotes and examples from experienced utility managers, along with great resources for more information. In addition, two case studies are presented below that review how two wastewater utilities recognized the mutual benefits of their EMS and asset management programs, with one utility integrating their EMS and asset management plans as they were developed and the second realizing the overlap of EMS after developing an asset management program.

Case Study: Camden County Municipal Utilities Authority

CCMUA Fast Facts

- 80 MGD sewage treatment plant
- 4th largest in New Jersey
- 145 employees operate and maintain the plant
- Increased sludge removal by 30% in 5 years
- Reduced wet weather bypasses from 24 to 2 in 5 years
- 24% reduction in O&M costs with rate held steady for 11 years

Through increased attention to operations and maintenance under an EMS, CCMUA optimized performance of its primary sedimentation tanks, resulting in reduced treatment requirements for its pure oxygen secondary system, saving $300k/year.

For more information on CCMUA's EMS and Asset Management programs, please visit: ***www.ccmua.org/emstoc.html***

Finding Alternatives to Privatization

In the late 90s, Camden County New Jersey initiated an external privatization process. The Camden County Municipal Utilities Authority (CCMUA) was allowed to put its own "oar in the water" and try to match or improve upon the private offer, resulting in an ambitious cost reduction and environmental optimization effort. During this process, a representative from the New Jersey Department of Environmental Protection (DEP) forwarded information about San Diego's EMS. The EMS approach seemed like a perfect fit for CCMUA, helping better organize existing activities and direct actions toward better meeting environmental and fiscal goals.

> *"…it was only through the EMS process that the Authority became more organized and systematic in identifying asset management improvement opportunities."*

The Authority's asset management program also originated out of the same drive for self improvement prompted by the privatization process. As CCMUA began identifying projects that would improve performance and reduce costs, it was obvious early on that while important to optimize processes and practices through EMS, the real low hanging fruit for improvement was with replacing inefficient, outdated equipment through an asset management program. From a cost standpoint, the rule of thumb was to ensure that cost savings would at least equal, if not exceed, the annual debt service payment for the new equipment. The result was significant environmental improvements and cost savings.

Integrating EMS and Asset Management

Integrating the EMS and AM programs was a natural fit at CCMUA, as it was only through the EMS process that the Authority became more organized and systematic in identifying asset management improvement opportunities. This integration opened the doors to a range of opportunities for improved environmental and asset management.

Discovering Significant Opportunities for Improvement

Under the theory that the most important thing a wastewater treatment plant can do to optimize performance is to get as much sludge out of the plant as quickly as possible, CCMUA focused on sludge thickening, dewatering and processing facilities. The Authority found that sludge facilities were unreliable and inefficient to some degree, adding to annual operating costs and forcing operators to run the plant sub-optimally.

The first thing CCMUA did was to find a more cost effective and reliable method of sludge processing. The Authority was criticized by some for closing the unreliable method (in-vessel sludge composting) because there was still significant annual debt service left on the facility. However, CCMUA was able to show that the debt service payment was a sunk cost anyway, and that it was possible to process sludge much more cheaply using an alternative method. This change saved CCMUA approximately $3 million in annual operating costs and enabled a reduction of rates.

CCMUA then focused on maximizing the dryness of the sludge to minimize disposal cost, finding that by upgrading thickening and dewatering equipment, the savings from dryer sludge cake and reduced maintenance costs far exceeded the debt service costs associated with the new equipment. CCMUA replicated this same approach to assessing opportunities for cost savings and environmental improvements across every process unit in the plant, resulting in an integrated EMS and AM system and continuous opportunities for improvement.

Case Study: Eugene, Oregon Wastewater Division

"In the wastewater business, employees inherently understand the need to keep our equipment running efficiently and safely in order to treat wastewater and protect the environment. As our asset management activities have evolved over the years into a more organized asset management system, it has been relatively easy for employees to understand and to connect this system to our environmental objectives."

- Peter Ruffier
Eugene, Oregon Wastewater Division

Environmental Management System

In the mid 1990s, Eugene Oregon Wastewater implemented their EMS and shortly thereafter was certified to the ISO 14001 EMS international standard. Eugene used its EMS to evaluate their control measures and used criteria that helped them select equipment with the lowest environmental impact, the most energy efficiency, precluding the use of hazardous chemicals where possible. The EMS process helped Eugene Wastewater Management realize how critical it is to know what equipment you have and to understand its performance history and environmental effect. The strong relationship between equipment condition and environmental performance has led to more connection and integration of Eugene's EMS with its asset management activities.

"A critical piece of equipment has a significant effect on the operating capability of the utility and in all likelihood plays a significant role in complying with environmental mandates as well. Our asset management system helps us evaluate the potential for equipment failure, and our EMS helps us evaluate the potential environmental impacts if the equipment fails. Combined, these analyses lessen the risk that we are missing something important and help us operate in a cost effective way with the smallest environmental impact possible."

- Peter Ruffier
Eugene, Oregon Wastewater Division

Asset Management

Eugene started their asset management program in the late 1970s as a condition of dollars received in a federal construction grant program for wastewater utility improvements. As recipients of Clean Water Act related construction grants, they were required to develop a maintenance strategy with a dedicated funding stream to cover the replacement of equipment and rehabilitation of infrastructure that was bought with the federal funds. As their asset management activities evolved over the years into a more organized asset management system, Eugene began to integrate asset management activities and EMS. As they evaluate new technologies, life cycle and environmental costs, they are better able to get a handle on their true costs over the life of equipment. This comprehensive cost based decision making helps Eugene make strong business decisions and to realize their environmental goals.

"Over the years, we've found that asset management consistently makes good business sense. Our asset inventory has also been valuable for insurance purposes. An accurate inventory of our assets and accurate and up to date record keeping about their condition helps us establish appropriate predictive and preventive maintenance, and ultimately helps us get the most out of our equipment. As our asset management activities have evolved over the years into a more organized asset management system, it has been relatively easy for us to understand and to connect this system to our environmental objectives and to our EMS."

- David Breitenstein
Eugene, Oregon Wastewater Division

Visit the Eugene, Oregon Wastewater Homepage for more information on their EMS and Asset Management programs.

"The EMS resulted in a culture change that has directly translated into cost savings. For example, during a recent build out, staff members took the initiative to review the proposed engineering specs and identified an opportunity that saved us over $100,000."

- Dan Thompson, City of Tacoma, Washington Public Works

"Pursuing an EMS has helped establish a framework for our organization to define its environmental commitment, to examine and manage the environmental impacts of our day-to-day operations, and to formalize how we do business in an environmentally sensitive manner"

- Judith M. Mueller Former President APWA, current Director of Public Works, Charlottesville, VA

EMS Resources: There are a number of great EMS tools, guides, and other resources available for water utilities on page 10 of this pamphlet.

What is an Environmental Management System?

An Environmental Management System (EMS) is a set of structured activities and processes that organizations use to identify environmental priorities, improve environmental performance and promote environmental understanding and responsibility as part of daily business operations. An EMS is built on a **Plan-Do-Check-Act** platform of continual improvement and provides a consistent framework for identifying and prioritizing how well you are currently managing your environmental impacts, identifies opportunities for improvements and tracks the progress and benefit of your improvement plans.

The most well known EMS framework is the ISO 14001 Environmental Management Standard (ANSI/ISO 14001:2004). The National Biosolids Partnership (NBP) uses a very similar framework for biosolids management. In addition, other approaches that can be used to enhance the effectiveness of an overall environmental management system approach for utilities include Asset Management; Capacity, Management, Operations, and Maintenance (CMOM) regulations; the Balanced Scorecard; and QualServ.

The 17 major elements of an ISO 14001-based EMS are listed below on the left, with corresponding questions commonly considered during implementation of an EMS on the right.

Planning 1) Environmental Policy 2) Environmental Aspects 3) Legal and Other Requirements 4) Objectives, Targets and Programs	▪ What is the current state of my environmental programs? ▪ What is my operational fenceline (i.e., what operations and activities do I manage)? ▪ Which of my operations are most critical and produce the most waste/emissions? Use the most resources? ▪ What environmental obligations must I follow? ▪ Who manages my environmental obligations? ▪ What do regulators require? ▪ What is the cost of changing a particular operation/activity?
Implementation and Operation 5) Resources, Roles, Responsibilities and Authority 6) Competence, Training and Awareness 7) Communication 8) Documentation 9) Control of Documents 10) Operational Control 11) Emergency Preparedness and Response	▪ How do I currently control my environmental programs? ▪ Who needs environmental training and how often? ▪ How are organizational roles and responsibilities defined and implemented? ▪ Who are my stakeholders (internal/external) regarding my environmental programs? ▪ What policies/programs do I have in place to manage my impacts/risks? ▪ What preventative maintenance programs are in place for operational equipment?
Checking 12) Monitoring and Measurement 13) Evaluation of Compliance 14) Nonconformity, Corrective and Preventive Action 15) Control of Records 16) Internal Audit	▪ What environmental parameters do I monitor/measure? ▪ What is my performance against my targets? ▪ What is my compliance status? ▪ What are my processes for reviewing and updating my environmental programs and plans?
17) Management Review	▪ What are my processes for reviewing and updating my environmental programs and plans? ▪ What are my best long-term funding/planning strategies for my environmental impacts/risks?

What is Asset Management?

Assets – the buildings, tools, pumping stations, pipelines, equipment and machinery used in the operation of your system.

"In utilities, data and information often get stuck in a department. The asset management processes really facilitate communication and help information flow out of the silo to the right locations in the organization."

- Rick Bickerstaff of Charleston Water, South Carolina

"Good asset management unifies the different disciplines (engineering, accounting, economists and managers) into a team with a business focus."

- Kevin Young Hunter Water Corporation Australia

Asset Management Resources:
There are a number of great Asset Management tools, guides, and other resources available for water utilities on utilities on page 10 of this pamphlet.

Asset management (AM) is a set of activities and planning processes that organizations use to manage and improve their operations and services in order to understand and get the most value from their physical assets, while controlling costs and ensuring compliance. The U.S. Environmental Protection Agency (EPA) recognizes the value of asset management for meeting compliance requirements, as well as a maintaining a reliable and sustainable water infrastructure, and in promoting organizational efficiency and public confidence.

Asset management processes help utilities inventory the condition, age, service history and estimated useful life of each asset and then prioritize assets based on criteria that include: remaining useful life; criticality of the asset; failure probability; cost; actual or potential risk to public health or environment; customer demands and improved operations.

During initial AM implementation, data and information collected helps build asset management plans that document preventive maintenance schedules, data collection instructions, operational controls and work instructions, performance monitoring requirements, quality control processes, necessary funding reserves for rehabilitation/replacement, etc.

The five major steps of an asset management system are listed below on the left, with corresponding questions commonly considered during implementation of an asset management program on the right.

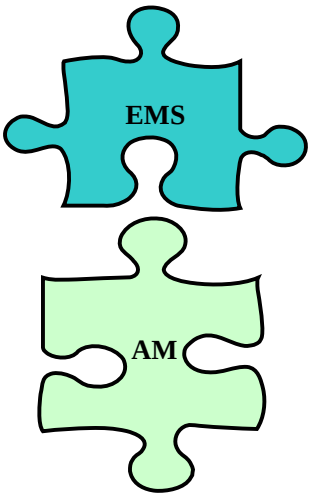
Step 1) Taking an Inventory of Assets	▪ What is the current state of my assets? ▪ What do I own? ▪ Where is it? ▪ What condition is it in? ▪ What is its remaining useful life? ▪ What is the economic value?
Step 2) Prioritizing Assets	▪ Given my system, which assets are critical to sustained performance? ▪ How does it fail? How can it fail? ▪ What is the likelihood of failure? ▪ What does it cost to repair? ▪ What are the consequences of failure?
Step 3) Developing an Asset Management Plan	▪ What are my best "minimum-life-cycle-cost" CIP and O&M strategies? ▪ How much will it cost to rehabilitate and replace my assets? ▪ What alternative management options exist and which are the most feasible for my organization? ▪ When will action be required on my assets? ▪ What preventative maintenance programs are in place for my assets?
Step 4) Implementing your Asset Management Plan	▪ What is my required sustained Level of Service? ▪ What budget reserves will I need for maintaining my assets? ▪ What is the demand for my services by my stakeholders? ▪ What do regulators require? ▪ What is my performance?
Step 5) Reviewing and Revising your Asset Management Plan	▪ What are my processes for reviewing and updating my asset programs and plans? ▪ What are my best long-term funding/planning strategies?

EMS and Asset Management Integration

Practical Experiences from Charleston Water, South Carolina

In conducting their Environmental Aspect analysis as part of their EMS, Charleston Water has been able to integrate their inventory of assets (criticality to operations, condition, replacement horizon, etc.) into their prioritization and strategic planning. Realizing that an EMS commonly lacks a financial component, this allowed the utility to build a well rounded assessment process.

As Charleston went through the asset management process, they discovered a variety of potential issues to address and felt a bit overwhelmed in the beginning. By integrating with the EMS and subsequent setting of objectives and targets, the utility found this made the process more focused and allowed them to better prioritize and assign accountability to specific actions and assets. Once specific issues were prioritized and goals were set, personnel had a beacon for achieving progress.



Utility managers are choosing a variety of systematic approaches for managing environmental performance, health and safety, physical infrastructure, financial performance and human resources. Management system approaches provide a set of standard review processes, procedures and improvement steps that support consistent, continual improvement. Environmental management and asset management systems – both built on the Plan-Do-Check-Act continual improvement framework – are two management approaches that have provided value to wastewater utilities across the United States.

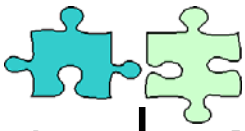
Utilities have generally implemented management systems one at a time. However, as utilities understand the relationship between systems, some have discovered it useful and efficient to leverage the information and benefits that each system offers into an integrated approach. For example, Charleston Water estimates that 80% of asset management elements can be developed using EMS processes. If you already have an EMS or are just developing one, here are a number of points where it makes sense to begin integrating asset management activities into your EMS.

Connection Point #1: Assessment

Utilities assessing how their products, activities and services impact the environment are in an excellent position to integrate and raise questions about incorporating an asset inventory and prioritization into the process.

2) Environmental Aspects

Step 1) Taking an Inventory of Assets
Step 2) Prioritizing Assets



In conducting an EMS environmental aspect and impact review, an organization identifies what operations and activities they manage and prioritizes the operations and activities based on the ones that use the most resources and produce the most waste and other factors.

In conducting an asset management review, an organization identifies what assets they manage and prioritizes their assets based on condition, economic value, likelihood of failure, cost to repair and consequence of failure.

As you conduct your environmental aspect analysis, consider which assets might be critical in managing and/or preventing adverse environmental impacts. Are pipes in good working order? Which assets are critical to maintain compliance and/or improve the environmental performance of activities and services? Does the condition or cost of repair of a particular asset impact your environmental aspect prioritization for a specific activity?

"The best way to achieve your EMS improvement goals comes from a smart and selective asset management program. That is where the low hanging fruit is with respect to cost minimization and process optimization. Conversely, the best way to get the most out of your asset management program is to have an EMS that provides an organized and systematic method to achieve those goals."

- Andy Kricun
CCMUA, New Jersey

"Information obtained through our EMS and asset management programs provides a much broader context for the public and elected officials to understand the costs associated with equipment rehabilitation and replacement in terms of energy efficiency, environmental compliance, public health and safety, and an overall return on their investment. The information helps our utility establish appropriate predictive and preventive maintenance programs as well as appropriate objectives and targets for environmental performance. Why spend money on an old pump? The associated economic and public health issues could be profound."
- Peter Ruffier,
Eugene, Oregon
Wastewater Division

EMS and Asset Management Integration Continued …

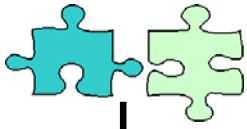
Connection Point #2: Objectives, and Targets and Programs

Establishing performance objectives and targets (and programs to manage them) for performance improvements is at the core of both EMS and asset management. In establishing performance objectives and targets for each system, utilities assess the current state of their key operations and assets, current and anticipated legal requirements, current capacity and future resource requirements and their current and future stakeholder interests and needs.

4) Objectives, Targets and Programs

Step 3) Developing an Asset Management Plan

Step 4) Implementing an Asset Management Plan



In establishing objectives for an EMS, priority aspects are reviewed and quantifiable targets are set for operations and activities based on technical options, legal requirements, stakeholder views and financial, operational and other organizational realities. Environmental management programs (EMPs), structured roadmaps that assign tasks, timelines, and roles and responsibilities, provide the direction for EMS objectives and targets.

In establishing objectives for an aging infrastructure, priority assets are reviewed and quantifiable targets are set for assets based on failure risk, the ability to finance asset maintenance now and replacement and customer demand in the future, legal requirements, stakeholder views and financial, operational and other organizational realities. Asset management programs assign tasks, timelines and roles and responsibilities, providing the direction for asset objectives and targets.

As you establish environmental objectives and targets, consider a more inclusive range of improvement goals that also focus on management of critical assets. This can expand your organization's focus from primarily environmental to that of a more comprehensive management system that will help you sustain your infrastructure assets. For example, maintaining environmental compliance and improving environmental performance can depend heavily on a utility's present and future capacity to manage assets nearing the end of their useful life, an issue closely related to preventive maintenance and/or replacement targets.

EMS – Fundamentally About Business Management
A utility can increasingly adapt their EMS system to launch or integrate other programs that move beyond explicitly targeted environmental issues. Removing the "E", it is simply about instilling a systematic management system that prioritizes risks (environmental, asset management, quality, security), sets objectives, targets, and action plans and assures operational controls are in place to minimize risks.

"Our asset management program provided the framework for developing a maintenance management system (maintenance policies, practices, and procedures) that in turn supported our EMS efforts to control our environmental impacts."

- Rick Bickerstaff, Charleston Water, South Carolina

Practical Experiences from Charleston Water, South Carolina

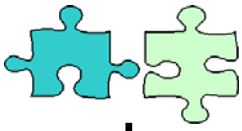
Once Charleston prioritized their combined risks and impacts from the EMS and asset management programs and set measurable objectives and targets, the utility constructed action plans for achieving performance. Plans include specific steps, responsibilities, training requirements, monitoring and measurement points, and operational controls to effectively manage and minimize risks and impacts. *(continued on Page 9)*

EMS and Asset Management Integration Continued …

Connection Point #3: Operational Controls and Monitoring and Measurement

When asset management is integrated into an EMS, the discussion extends beyond environmental issues to include how the organization can protect community assets, minimize the cost of owning and operating the utility and continuously deliver desired levels of customer service, thereby promoting better efficiency, understanding, and control and preparedness for future service demands.

10) Operational Control **11) Monitoring and Measurement**	**Step 3) Developing an Asset Management Plan** **Step 4) Implementing your Asset Management Plan**



In establishing operational controls and monitoring and measurement programs for an EMS, a review of significant aspects and impacts will identify operations and activities that must have controls (e.g., procedures, work instructions, training, roles and responsibilities, etc.) in place and those operations and activities that must have parameters and performance indicators that must be monitored and measured.

In developing and implementing an asset management plan, a review of priority assets will identify those that require management by preventative maintenance and equipment calibration, as well as assets that must have parameters and performance indicators that must be monitored and measured.

Verifying the suitability and effectiveness of existing procedures, work instructions, staff roles and responsibilities, training, and other operational controls that manage priority aspects and assets will not only minimize their potential environmental impacts and cost, but this review will likely provide important information in assigning performance standards and setting expectations for preventative maintenance and replacement of critical assets, maintaining environmental performance and satisfactory customer service levels.

Consider utility staff expanding maintenance procedures to include condition assessment of pipelines, pumping stations and other critical assets. What additional information and training would be necessary for staff to complete these tasks effectively? Who in the organization would find this information useful, where would the information be stored and in what form?

In addition, both EMS and asset management approaches require your organization to develop measurable performance goals to monitor and measure progress as part of management plans. Data collected can be used to communicate and improve your performance.

Charleston's action plans formed the basis for monthly operating reports, which were developed by each of the 17 departments within the utility. The operating reports included trend data, charts and graphs demonstrating performance against defined objectives and targets. These reports are presented to executive management on a monthly basis, allowing for targeted and continuous strategic adjustments and planning.

For more information on Charleston's integrated system, please visit www.charlestonwater.org.

"Employees not only turn the valves now as part of their regular responsibilities, but also consider what effect this has on the value of the asset and the environmental consequences of not turning it correctly."

- Rick Bickerstaff, Charleston Water, South Carolina

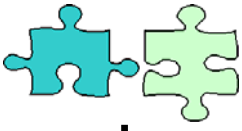
EMS and Asset Management Integration Continued …

Connection Point #4: Management Review

A management review is what drives continual improvement in management system approaches. Increased operational efficiency and progress in meeting environmental performance improvement goals depend to some extent on the reliability of a utility's assets. Therefore, there is logic in integrating asset management and environmental considerations into the management review process.

17) Management Review

Step 5) Reviewing and Revising Asset Management Plans



In establishing periodic management reviews for an EMS, environmental programs, performance goals and EMS roles and responsibilities are reviewed to verify that the EMS is functioning as intended. In addition, EMS and environmental program budgets are reviewed and revised for short- and long-term planning and management of an organization's environmental risk.

In establishing periodic management reviews for asset management, asset management plans, performance goals and roles and responsibilities are reviewed to verify that asset management plans and programs are functioning as intended. In addition, asset management budgets are reviewed for short- and long-term planning and management of an organization's asset/infrastructure risk.

Questions a combined EMS and asset management review might consider include: How are maintenance protocols and rehabilitation and renewal strategies improving environmental performance? What shifts in financial resource requirements should we plan for based on changing demographics and expansion requirements? Will our aging assets allow us to meet changes in regulation and future demand?

As the relationship between asset management and environmental performance becomes more obvious, organizations will stop seeing EMS and asset management as individual initiatives and will begin to harness their combined effectiveness for short- and long-term strategic planning. Expanding the scope of the management review beyond environmental performance will involve more of your decision makers (e.g., financial, human resources, engineering, etc.) in determining what is important to the community, identifying measurements of value and defining success. In this way continual improvement is not just another initiative, but a cross-functional business decision and an opportunity to promote sustainable service to the community in the future.

"Our theory was that the most important thing that we could do to optimize the performance of our wastewater treatment plant is to get as much sludge out of the plant as quickly as possible. Therefore, sludge thickening, dewatering and processing became our priority environmental aspect and our sludge facilities our priority assets – our low hanging fruit with respect to opportunities for cost savings and environmental improvement."

- Andy Kricun
CCMUA, New Jersey

"The EMS has resulted in employees being better trained, accepting more ownership, and understanding that they can give feedback and have more say in the way we do business. This has resulted in creative cost savings opportunities/ suggestions, which in turn has greatly enhanced the quality of our services as well as operational consistency."

- Beth Eckert
Gastonia, North Carolina Public Works and Utilities Department

EMS and Asset Management Integration Continued …

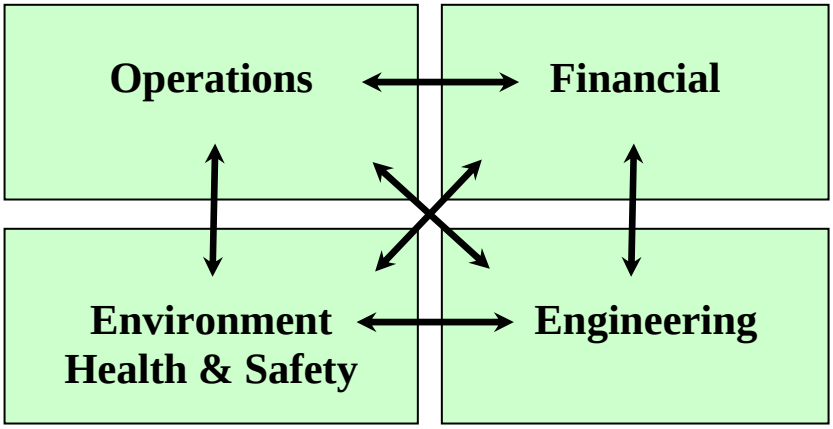
The four connection points identified in this pamphlet are just a few examples of where a wastewater utility could build asset management plans on their EMS plans/programs. However, there are several other common features that can help utilities implement a more integrated management system, including management commitment/leadership, continual improvement and holding cross-functional team meetings to name just a few.

Continual Improvement and Management Commitment/Leadership

Like an EMS, asset management is driven by activities that reflect a commitment to continual improvement, compliance and prevention of pollution. For example, maintaining, repairing and replacing assets can help a utility maintain environmental compliance, reduce life-cycle costs and maintain aging assets, and improve customer service. A more inclusive range of improvement goals can change an organization's focus from primarily environmental to that of a more sustainable water infrastructure. In addition, management commitment, visibility and leadership are needed to ensure that the necessary resources – tools, training and expertise – are available to implementing the systems and are keys to success as organizations manage succession, changing requirements and customer demands.

Cross-Functional Leadership Teams

Organizations have found value in combining operational and environmental staff on their EMS teams. Adding financial, engineering, operations, human resource, procurement staff, etc. to these leadership teams brings information about topics such as asset management and maintenance, the budget process, construction demands, costs and reliability and helps the organization determine how adequate human and financial resources will be available to implement necessary performance improvements now and to meet future service demands. An integrated team provides the ability for the organization to design a long range strategic vision that is not just another environmental initiative, but a cross-functional opportunity for the organization to create a sustainable water infrastructure.



The previous sections have highlighted a few logical connection points between an environmental management system and an asset management program, as well as some direction for further examination of the similarities and opportunities for integration. As utilities continue to employ such tools for promoting performance, there is every expectation that more and more practical experiences will be shared and that implementation of integrated systems will become commonplace within utility management.

"The most effective approach to educate practitioners about asset management is to ask innovative practitioners to share knowledge with others until the leading-edge practices become the norm at all utilities. Bringing about excellence in the execution of particular processes, procedures, techniques and tasks is above all a function of hard work, training, coaching, peer-to-peer exchange, mentoring and benchmarking."

- Steve Allbee
U.S. EPA

Did You Know?
Several hundred water service providers have some form of an asset management or EMS improvement program already under way. Maybe you are one of them. We invite you to share your experiences and become part of the "knowledge transfer" of best practices that will provide benefit industry-wide. Visit www.peercenter.net today!

PEER center

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Additional Resources

EMS Resources:

EMS Toolkit for Wastewater Utilities

EMS Compendium for Wastewater Utility Managers

EMS Handbook for Wastewater Utilities

EMS Aspects Identification and Prioritization Workbook

Asset Management Resources:

Asset Management: A Handbook for Small Water Systems

CAPFinance

GASB 34: What Is It? Why Should You Care?

US EPA's Asset Management Resources

Water Environment Research Foundation's (WERF's) SIMPLE Resources

Management System Resources:

Managing for Excellence: Analysis of Water and Wastewater Utility Management Systems

Continual Improvement in Utility Management: A Framework for Integration

Moving Towards Comprehensive Utility Management Systems Report

Additional Web Resource Links:

American Water Works Association: www.awwa.org

Association of Metropolitan Water Agencies: www.amwa.net

Association of State Drinking Water Administrations: www.asdwa.org

Government Finance Officers Association: www.gfoa.org

National Association of Regulatory Utility Commissioners: www.naruc.org

National Association of Water Companies: www.nawc.org

National Rural Water Association: www.nrwa.org

Rural Community Assistance Program: www.rcap.org

Rural Utilities Service: www.usda.gov/rus

Environmental Management System/Asset Management Steering Committee
In closing, we would like to thank each of the following wastewater sector practitioners for their time and dedication to this effort. Their unique insight and experiences into building integrated systems within the wastewater utility sector was invaluable.

- Rick Bickerstaff, bickerstaffr@charlestoncpw.com, Charleston Water, SC
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